

# Baryon Resonance Electroproduction at High Momentum Transfer

(Extension of TJNAF-CEBAF Experiment 94-014)

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## ABSTRACT

In Hall C experiment 94-014 the excitation of the  $\Delta(1232)$  and the  $S_{11}(1535)$  resonances were observed via their decay into the  $\pi^0$  and  $\eta$  respectively at near 2.8 and 4  $\text{GeV}^2/c^2$ . It is proposed to extend these measurements to  $Q^2$  near 6  $\text{GeV}^2/c^2$  utilizing a 5 GeV electron beam. The experiment will measure the kinematically complete reactions  $p(e, e'p)\pi^0, \eta$ . Since at high  $Q^2$  the protons emerge in a narrow cone around the  $\vec{q}$  vector, a large fraction of the in-plane and out-of-plane c.m. decay spectrum can be reconstructed using the HMS and SOS spectrometers. The objective of the experiment is to measure the resonance amplitudes at as high  $Q^2$  as obtainable at TJNAF in order to assess the transition between low  $Q^2$  physics, where *soft* non-perturbative QCD processes characterized by constituent quarks dominate, to the high  $Q^2$ , regime where *hard* QCD processes characterized by current quarks, and eventually pQCD becomes increasingly important. Such measurements at these  $Q^2$  have not been previously possible.

Reaction:  $p(e, e'p)\pi^0, \eta$  @  $Q^2 \approx 6 \text{ GeV}^2$

$E_{\text{beam}}$	$I_{\text{max}}$	target	beam time	proton detector	electron detector
5 GeV	160 $\mu\text{A}$	4cm L H	20 days	HMS	SOS